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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/683,606	10/09/2003	Garo J. Derderian	108298738US	1013

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PERKINS COIE LLP
PATENT-SEA
P.O. BOX 1247
SEATTLE, WA 98111-1247

EXAMINER	
TUROCY, DAVID P	
ART UNIT	**PAPER NUMBER**
1762	

DATE MAILED: 11/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	**Application No.** 10/683,606	**Applicant(s)** DERDERIAN, GARO J.	
	Examiner David Turocy	**Art Unit** 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/2/06*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-11 and 13-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-11 and 13-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment, filed 10/2/06, have been fully considered and reviewed by the examiner. The examiner notes the amendment to the claims 1, 11, and 19 and the subsequent cancellation of claims 5, 6, and 8. The 35 USC 112 1st and 2nd paragraph rejection to the claims have been withdrawn because of the amendment. Claims 1-4, 8-11, and 13-23 are pending.

Response to Arguments

2. Applicant's arguments filed 10/2/2006 have been fully considered but they are not persuasive. Applicants have argued against the Mochizuki reference stating the reference relies on the oxidized plasma, not the reaction chamber temperature to cause the film on the window to convert to an oxide. However, such an argument is not commensurate in scope with the claims because the claims fail to require the temperature of the chamber to be the cause of the oxidation.

All other arguments are deemed moot because they are directed at newly added limitations that will addressed in the rejections below.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

> invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-4 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted state of the art ("ASA") as taught by the applicants description in view of Japanese Patent Abstract JP 63111177A by Mochizuki et al., hereafter Mochizuki.

ASA teaches a known method depositing conductive material includes plasma CVD, including plasma processing vessel and a microwave transmitting window (Paragraph 0005). ASA discloses the microwaves enter through the window and into the process chamber and produce plasma to depose the metal onto the workpiece (0006). ASA discloses depositing a conductive material onto the workpiece results in a secondary deposit of metal on the interior surface of the window and the secondary deposit builds up as successive workpieces are processed (0006). Therefore ASA discloses that it is known in the art to place a microfeature workpiece in the reaction chamber, inject gas into the chamber, generate a plasma within the chamber and depositing an electrically conductive material, which inherently has a first transmissivity, on the surface of the window and the workpiece and repeat the process with other workpieces (0005-0006).

However, ASA fails to disclose transforming the conductive material on the window into a substantially dielectric material.

However, Mochizuki teaches a method of cleaning the interior of a chamber by converting a film deposited on the window into a dielectric material (Abstract). Mochizuki discloses a secondary film stuck on the window is converted into a dielectric material to prevent reduction of efficiency of the microwave (Abstract). Mochizuki teaches of converting the deposited film to an oxide. Mochizuki clearly suggests injecting a fluid comprising oxygen into the vapor reaction chamber (see figures); see injection (15) directed at window (11). Mochizuki discloses transforming the secondary film while the film is thin, and therefore the teaching of Mochizuki reasonably suggests to one of ordinary skill in the art to convert a secondary film to a dielectric material, which remains on the window without decreasing the efficiency of the microwave.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the ASA to convert the conductive material deposited on the window into a dielectric material as suggested by Mochizuki to provide a desirable cleaning of a deposition chamber to reap the benefits of providing cleaning of a plasma process while the efficiency of microwaves is prevented from being lowered.

The admitted state of the art in view of Mochizuki fails to disclose limiting the amount of time to cool and heat by performing the deposition and the conversion at approximately the same temperature. However, it is the examiners position that it would have been obvious to one of ordinary skill in the art at the time of the invention to limit the amount of cooling and heating by performing both the deposition and the transformation at the same temperature because by doing so one would reap the benefits of increase throughput and efficiency, each of which are desirable to one of ordinary skill in the art. One would reasonably expect success for transformation at the deposition temperature because ASA discloses using plasma for deposition and

Mochizuki discloses conversion to an oxide using a plasma, which could reasonably be expected to operate at the same temperatures. The prior art can be modified or combined to reject claims as prima facie obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375.

Additionally, it is the examiners position that the process parameters of temperature is a known result effective variable. Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the conversion temperature used in the process of the admitted state of the art in view of Mochizuki, through routine experimentation including a temperature equal to the deposition temperature, to efficiently and effectively convert the secondary film to a dielectric material.

Claim 3: Mochizuki discloses using a source gas comprising WF_6 and clearly discloses depositing a film comprising tungsten or Aluminum (Page 3, Left Column).

Claims 9 and 10: The admitted state of the art in view of Mochizuki fails to disclose concurrently or intermittently flowing the process gases into the plasma chamber. It is the examiners position that intermittent and concurrent gas flow is known in the art and would have been obvious to one of ordinary skill in the art use either intermittent or concurrent precursor gas flow to provide the gases into a chamber during a plasma coating operation.

5. Claims 11 and 13-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over ASA in view of Mochizuki as applied above and further in view of Japanese Patent Abstract 63020490 by Nakada, hereafter Nakada.

ASA in view of Mochizuki is applied here as applied above, in addition ASA discloses conductive films are deposited on the inner surface of the chamber and Mochizuki discloses metal films during deposition using plasma will stick to the window and inhibit microwave energy into the chamber (page 5), however, the references fail to teach of transforming titanium metal deposited on the metal to titanium oxide.

However, Nakada discloses, during vapor deposition process for depositing films such as tungsten or titanium, a portion of the metal film will stick to the inner surface of the chamber walls. Nakada additionally discloses titanium on the walls can be converted into an oxide film.

Therefore, taking the reference collectively, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify ASA in view of Mochizuki to convert titanium on the windows to titanium oxide as suggested by Nakada to provide a desirable cleaning of the chamber walls during film deposition because ASA in view of Mochizuki discloses conductive materials are known to be deposited on windows during vapor deposition and Nakada discloses titanium is known in the art to deposit on the chamber walls and then subsequently converted to an oxide. Please note that the test of obviousness is not an express suggestion of the claimed invention in any or all references, but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them (*In re Rosselet*, 146 USPQ 183). Alternatively, one would reasonably expect success in modifying the process of ASA in view of Mochizuki to transform a titanium film deposited on the window into a titanium oxide because Nakada discloses supplying oxygen gas into the chamber will effectively transform titanium into titanium oxide. The prior art can be modified or combined to reject claims as prima facie obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375.

6. Claims 19-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over ASA in view of Mochizuki and Nakada and further in view of US Patent 6689220 by Nguyen, hereafter Nguyen.

ASA in view of Mochizuki and Nakada are applied here as applied above but the references fail to discloses a atomic layer deposition process as required by the preamble in combination with a plasma chemical vapor deposition process.

However, Nguyen discloses a process system for depositing highly controlled film on a workpiece discloses using a plasma enhanced atomic layer deposition process, including supplying, during the PEALD process, intermittent or continuous flow of precursor gases into the process (Abstract, Column 2, lines 39-40, column 4, lines 28-30). Nguyen discloses using microwaves to provide energy into system to form a plasma (Column 2, lines 64).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify ASA in view of Mochizuki and Nakada to use the plasma enhanced atomic layer deposition process with a reasonable expectation of success as suggested by Nguyen to provide a desirable layer deposition on a workpiece to reap the benefit of providing a highly controlled layered film as taught by Nguyen. The prior art can be modified or combined to reject claims as prima facie obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Turocy
AU 1762

FRED J. PARKER
PRIMARY EXAMINER